



PATENT
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IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE

Applicant: Reiser et al.

Serial No.: 08/996,776

Filed: December 23, 1997

For: AUTOMATIC LEARNING OF
BELIEF FUNCTIONS

Group Art Unit: 2857

Examiner: K. Patterson

I hereby certify that this paper is being
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December 8, 1998

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DECLARATION UNDER 37 C.F.R. §1.132 OF
KURT REISER

I, Kurt Reiser, Ph.D., hereby declare as follows:

1. I am a co-inventor of the subject matter in the above identified U.S. patent application.
2. I received my Bachelor of Science degree in Computer Science in 1984 from the University of Illinois at Urbana. I received my Master of Science in 1987 and my doctorate in 1991, both in Computer Science from the University of Southern California. I am currently Research Project Manager for the Information Sciences Laboratory at HRL Laboratories in Malibu, California. I am also the

author of numerous scientific articles and an inventor on numerous patents as indicated in a copy of my current *curriculum vitae*, which is appended as Exhibit 1.

3. As co-inventor, I am thoroughly familiar with patent application Serial No. 08/996,776 filed December 23, 1997, and I have studied the official action dated September 8, 1998 paying particular attention to the examiner's rejections on the basis that the disclosure in the specification of the patent application does not enable a skilled artisan to configure a computer to possess the requisite functionality and does not interrelate the computer with other elements to yield the requisite functionality, without undue experimentation.

4. This invention is within a family of technology known as artificial neural networks. Therefore, the skill level required to implement the disclosed invention is the same as that commonly associated with the development and/or implementation of artificial neural networks.

5. The common skill level required to develop an/or implement artificial neural networks includes a bachelor or master degree in computer science, electrical engineering or mathematics, industrial or research experience with partial differential equations and optimization, and industrial or research experience in computer programming and numerical integration.

6. Artificial neural networks are typically specified using an error function and an update rule. It is well within the capabilities of a persons having ordinary skill in this art to produce a computer program for optimization given only an error function and an update rule. This fact is reflected repeatedly in the amount of information typically provided in technical publications on artificial neural networks.

7. Authors of technical publications in the field of artificial neural networks typically do not disclose computer-program implementation details because they rightly assume that a skilled artisan can easily produce a computer program that performs the optimizations recited in the publication. Technical papers in the relevant art typically disclose only an error function to be optimized and an analytic treatment that gives rise to an update rule. For example, only a brief discussion of gradient descent, which defines an error function and an update rule is given on pages 103-4 of "Introduction to the Theory of Neural Computation" by Hertz, Krogh and Palmer, Addison-Wesley Publishing Company, 1991. An even more brief discussion of a "cost" (instead of "error") function that is minimized by an update can be found on page 90 of "Neural Networks for Optimization and Signal Processing", Cichoki and Unbehauen, John Wiley and Sons, 1993.

8. One particularly relevant example is an article written by Professor John Hopfield. The Hopfield article has been cited numerous times in the field of

artificial neural networks and is attached as Exhibit 2. The Hopfield article specifies an update rule on page 158 and an energy function that is minimized during recall. However, the Hopfield article does not disclose details on how to implement the update rule. As one very familiar with the level of ordinary skill in this art, I find the Hopfield article sufficient to allow such a person of ordinary skill to implement the concept on a computer without undue experimentation.

9. Similar to the Hopfield article, the specification of our patent application discloses possible error terms (equations 1 and 2) and an update scheme (equation 3). The differentiation shown in the update scheme of equation 3 is such that anyone who has had calculus can compute the differentiation.

10. As one who is very familiar with the level of ordinary skill in this art, I believe that the disclosure in the specification of our patent application is such that would take a skilled artisan approximately one day's work implement the concept in a computer. Accordingly, I do not believe that implementing a computer program from the disclosure of our patent application involves undue experimentation.

11. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like made are punishable by fine or imprisonment, or both, under

Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the above-identified application or any patent issuing thereon.



Kurt Reiser Ph.D.

Dated: 12/7/98, 1998